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PREVENTING STROKE AT DOOR STEP– NEED FOR A PARADIGM SHIFT IN DELIVERY OF PREVENTIVE HEALTHCARE

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Although stroke is a preventable disease, it is increasing globally. Only few risk factors are responsible for much of the leading noncommunicable diseases, yet those remain poorly controlled, despite being the most affordable way of promoting health and preventing disease [1]. Lifestyle modification including cessation of smoking, making aerobic physical activity a routine, certain changes in diet, and aggressive management of risk factors are all part of stroke prevention strategies [2]. Stroke prevention strategies are not only successful in decreasing the risk of incident and recurrent stroke, but have also resulted in decline in stroke mortality, particularly with the improved control of hypertension [3]. Provision of low cost prescription drugs have higher impact on improving cardiovascular morbidity and population health as well as cutting healthcare cost than lifestyle modification strategies [4]. With a very high stroke burden, the stroke specific mortality in Pakistan, the sixth largest population in the world has been reported as high as 20% [5]. A very high prevalence of stroke risk factors has been reported from Pakistan with as high as 73% of stroke sufferers having hypertension, and an estimated one in every 3 adult above the age of 45 suffering from hypertension in the community [6]. Almost one third of people with hypertension are unaware of their hypertension, complicated further by a huge treatment gap with less than one in five patients with hypertension receiving treatment [6-7]. More than 33% of hospitalized stroke patients, and 10% of adult population being diabetics [6-7] makes the number of diabetics in Pakistan sixth highest in the world [8]. A very high prevalence of obesity, dyslipidemia and smoking has been reported in hospital based studies from Pakistan [7]. Although the burden of chronic noncommunicable diseases is increasing in developing world, the cost effective interventions are difficult to implement. Traditionally it has been considered the responsibility of the government to provide the healthcare facilities, nongovernmental organizations and private sector have always been a significant

participant in healthcare delivery. Pakistanis spend approximately 3% of GDP on healthcare of which <1% is contributed by the government, making more than two thirds of expenditure private [9]. Caring for chronic diseases is complex and requires multidimensional approach, which is not only time consuming but also requires the participation of diverse group of healthcare professionals. A recent trial of facilitation of chronic care delivery at primary care centers failed to show improved delivery of cardiovascular care in terms of adherence to best practice guidelines [10]. Primary healthcare facilities in Pakistan are not only inadequate and poorly functional, those are also underutilized [11]. Lack of human resources, inadequate supplies, absence of essential medicines and defective equipment are among the number of reasons that make these facilities suboptimal. These inadequacies are manifest in management of simple ailments like upper respiratory tract infection, diarrhea, maternal and child health care and basic immunization [11], let alone the complexity of chronic noncommunicable diseases. With this background, expecting the routine healthcare model to prevent and ameliorate the monstrous diseases like stroke and cardiovascular disease is nothing but awishful thinking. Synergium, a stroke forum recommended new systems of collaboration, emphasis on adequate and effective programs for prevention and healthcare education, involvement of community healthcare workers, and utilization of novel technology and media interfaces to accelerate progress in stroke prevention [1]. The concept of delivery of healthcare in the community using a mobile van service was established in 1992 by Beth Israel Hospital in Boston. This service aimed at eliminating the financial and logistical barriers, improving access to care and healthy behaviors, and helping managing and preventing chronic diseases [12]. There are now about 1500 mobile clinics in USA which not only provide high quality, low cost healthcare but have also played a significant role in preventing and managing chronic diseases [13]. The knowledgeable neighbor program of

Family Van of Harvard Medical School not only entrusted the community but also resulted in increased detection of previously undiagnosed hypertension and diabetes ^[14]. Pakistan is one of the highest user of mobile phone technology in the world with approximately 150 million (approximately 75% of the population) mobile phone users, and five service providers ^[15]. Research has shown high acceptability of mobile phone based interventions for healthcare in Pakistani population ^[16]. Not only that people are receptive to this use of technology, the actual technology based randomized interventions have shown improvement in medication adherence, decrease in diastolic blood pressure, and improved diabetes control ^[17-18]. This editorial aims to propose a shift in model of healthcare delivery in reference to preventive care in chronic noncommunicable diseases. Instead of waiting for people to seek preventive care, an active aggressive approach should be utilized to deliver the most effective, cheap and practical interventions at the doorstep. With public and private partnership, a setup needs to be established that not only carries out this task but also monitors the utility, meaningfulness and cost effectiveness of this model. We propose establishing a mobile van/car service that is staffed by community health workers, nursing staff and technical personnel. Senior medical students and house officers can be encouraged to participate in this effort by making this an elective rotation with due credit in final assessments and evaluations. The mobile vans/cars should be equipped with computers that are connected to monitoring/advisory centers through telemedicine links. The monitoring/advisory centers can be run by a large number of female doctors in the country who do not join the clinical work force after graduation. This concept has already been successfully adapted by doctHERs ^[19]. Organizations like doctHERs and other volunteer medical organizations can be made partners in the effort. The female doctors can get additional focused training by specialists in the field. A team of experts, who are interested in volunteering, should be formed to supervise the process as well as teaching and counseling the female doctors as well as community healthcare workers and nursing staff. A number of expatriate Pakistani physicians are eager to participate in the healthcare in the country remotely but do not find appropriate opportunities to participate. This highly qualified expatriate force can be utilized for this purpose. The mobile van/car team should be provided with mobile phones and laptop computers with WiFi/internet access to reach their monitoring/advisory center for advice/approval of plans. The mobile vans/cars should also have portable blood pressure monitors and glucometers. Additionally, point

of care cholesterol checking machines should be available. Simple, easy to understand, pictorial educational leaflets should be provided targeting at the most important determinants of preventive care including hypertension, diabetes mellitus, dyslipidemia, smoking cessation, and low salt intake. These mobile vans/cars should visit prespecified geographical areas and approach the community at their doorstep. Local elders and leaders can be made part of the mobile team to increase the authenticity of the team as well as making the community more accessible. Currently, the mobile polio teams are trying to deliver the immunization to every child in Pakistan. In the beginning of the project for first 2 to 3 years, these mobile vans/cars should be attached to these mobile polio teams. Once the mobile team reaches the doorstep, the consenting people should be evaluated for hypertension, diabetes, hypercholesterolemia, smoking, and salt intake. General education about all of the targeted conditions should be provided and eligible candidates should be prescribed appropriate, affordable medications after consultation with monitoring/advisory center. Data on all these consenting individuals should be recorded in computerized databank including their mobile phone numbers and contact details. Once enrolled in databank, these individuals should get routine reminders about medication intake, decreasing the salt intake and cessation of smoking. The geographical distribution of each mobile van/car team should be such that they can revisit the same locality at a fixed interval of one to two months and check for the compliance, problems, questions and re-education. Pharmaceutical industry is a huge and profitable industry in the country. The partnership with the industry can ensure availability of locally made effective but cheap medications in various categories constantly available to these mobile teams. Patients who are newly diagnosed with medical conditions and started on treatment should be provided initial supply of the medications until the next visit of the team. However, those should be encouraged to feel the ownership of their illness by purchasing the medications for continued use. It is well known that continued supply of free services render those less effective. To make these mobile vans/cars a successful intervention, electronic media including television, radio, and electronic newspapers, blogs and social media applications should be used to support and promote these interventions. Only 2 minutes of prime time support on television can make a huge difference in acceptability and success of this intervention. The regulatory authorities can mandate use of 2 to 5 minutes of prime time on a daily basis for the

promotion of health and prevention of disease. Although the initial starting cost may be high and the process cumbersome and labor intensive, the long term cost saving and healthcare quality improvements surpass the initial investment. An urgent and aggressive plan in this direction may be the only way to prevent future catastrophe that our nation is facing from the monsters of chronic noncommunicable diseases that are going to take a heavy toll in the form of stroke and cardiovascular morbidity and mortality. This paradigm shift is not a new wheel. Various components of this wheel are used in various formats across the world with high success as described above. It is now high time for us to wake up from our slumber and combine all the components of the wheel and get it on the roll for a new beginning of our future.

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Ismail Khatri: Study concept and design, protocol writing, data collection, data analysis, manuscript writing, manuscript review

Saad Farooq: data collection, data analysis, manuscript writing, manuscript review

Muneeza Khatri: data collection, data analysis, manuscript writing, manuscript review